

Claudia Loebel, M.D. Ph.D.

Assistant Professor of Bioengineering, University of Pennsylvania

I am writing to express my keen interest in becoming a council member within the Cell and Molecular Bioengineering (CMBE) Special Interest Group. I am excited about the opportunity to contribute to the CMBE community's efforts in understanding the influence of physical forces on biological processes and translating these insights into improved medical practices. As a researcher with a background in cell biology, engineering and medicine my work has consistently been guided by the underlying goal to bridge fundamental science with translational applications. I am particularly drawn to the CMBE SIG's mission to cultivate an interdisciplinary community that pushes the boundaries of our understanding of physical forces both in basics and translational science. The opportunity to collaborate with a diverse cohort of scientists and clinicians to achieve these goals is both exciting and inspiring. I am eager to contribute not only my scientific expertise but also to engage in fruitful discussions that propel the field forward through interdisciplinary collaboration.

Beyond my research, I have pursued initiatives aimed at diversifying our scientific community and supporting the next generation of researchers. For example, in 2022, as the co-chair of the inaugural Macromolecular Science mental health workshop at the University of Michigan, I successfully facilitated a keynote presentation by Dr. Sharon Milgram, Director of the NIH Office of Intramural Training & Education, focusing on resilience. Following this pivotal discussion, I led a dialogue on ongoing challenges that need urgent attention within our community, highlighting actionable strategies for positive change. These experiences have strengthened my ability to foster inclusive and supportive environments in academic and professional settings.

I have also been actively involved in initiatives targeting the mentoring and recruitment of minority student populations. In 2024, my group received the Elizabeth Caroline Crosby Grant which allowed us to support minority students at various stages of their academic careers. Such initiatives not only diversify our community but also enrich the scientific dialogue with a multitude of perspectives, ultimately enhancing the quality of research and innovation.

In service to the wider scientific community, I have held leadership roles within the Society for Biomaterials, including co-chair (2019-2020) and chair (2021-2022) of the Young Scientists Group. Through these roles, I organized networking events and workshops focused on mental health and resilience—topics increasingly recognized as essential for sustaining researchers' long-term engagement and productivity. Additionally, my initiation of the Postdoctoral Recognition Award Competition highlights my dedication to supporting emerging leaders in our field, providing them with critical platforms for recognition and professional growth.

Being a part of the CMBE SIG Council would allow me to integrate these leadership experiences with my scientific goals, helping to shape the future of the CMBE field. It would also afford me the invaluable opportunity to strengthen the network of fellow researchers committed to the intersection of biology, engineering, and medicine. As a scientist with a medical degree, **I would specifically see my role in engaging clinical fellows at various stages of their career in presenting and participating in CMBE meetings and discussions.** I believe that the CMBE community is an ideal platform for improving the translation of our fundamental understanding into medical practices.

I am enthusiastic about the possibility of contributing to the CMBE SIG's mission and am hopeful that my background, experience, and passion align with the goals of the council. Thank you for considering my application. I look forward to working with council members to advance the scientific and community-oriented objectives of the CMBE SIG.

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EDUCATION

- 2013 – 2016 **ETH Zurich, Switzerland**
Ph.D., Department of Health Sciences and Technology (October 2016)
Advisors: Marcy Zenobi-Wong, Ph.D., David Eglin, Ph.D.
- 2005 – 2011 **Martin-Luther University Halle-Wittenberg, Germany**
M.D. (November 2011)

ACADEMIC POSITIONS AND EMPLOYMENT

- 2025 - present **Loebel Lab**
Department of Bioengineering and Center for Precision Engineering for Health, University of Pennsylvania, Philadelphia, PA
Assistant Professor
- 2021 - 2024 **Loebel Lab**
Department of Materials Science & Engineering, University of Michigan, Ann Arbor, MI
Assistant Professor
- 2016 - 2021 **Burdick Lab** (Advisor Jason A. Burdick, Ph.D.)
Department of Bioengineering, University of Pennsylvania, Philadelphia, PA
Postdoctoral Fellow
- 2013 - 2016 **Tissue Engineering and Biofabrication Laboratory and Biomedical Materials Program**
(Advisors Marcy Zenobi-Wong, Ph.D., David Eglin, Ph.D.)
ETH Zurich and AO Research Institute, Davos, Switzerland
Graduate Research Assistant
- 2012 – 2013 **Progenitor Cell Biology and Mechanoregulation Program** (Advisor Martin J. Stoddart, Ph.D.)
AO Research Institute, AO Foundation, Davos, Switzerland
AO Medical Research Fellow
- 2007 – 2011 **Molecular Pathology Group** (Advisor: Frank Bartel, Ph.D.)
Institute of Pathology University Halle-Wittenberg, Halle, Germany
Medical Research Assistant

GRANTS AND FELLOWSHIPS

- 2025 – 2030 R35 MIRA 'Implementing the nascent ECM into the dynamic reciprocity of cell-ECM interactions' (NIH NIGMS R35GM157063-01, PI)
- 2023 – 2028 Packard Fellowship: 'Matrix memory: decoding the rules of extracellular information tracking and recycling' Packard David and Lucile Foundation
- 2023 – 2028 'Regulation of Tendon Enthesis Development and Healing via HIF1' (NIH NIAMS 1R01AR082348, co-I)
- 2023 – 2028 'Bioengineered corneal endothelial graft using photodegradable device to induce graft-host integration' (NIH NEI 1R01EY035305, co-I)

2023 – 2025	'Mechanoregulation of nascent fibrin fibrillogenesis in engineered matrices' (Michigan-Israel Partnership, co-PI)
2022 - 2024	American Lung Association Innovation Award: 'Mechanotransduction in transitional alveolar epithelial cell states' (ALA IA -939940, PI)
2022 - 2024	'Cell-type specific metabolic labeling to study skin and lung fibrosis' (UM Skin Biology and Diseases Resource-based Center, co-PI)
2021 - 2026	Biological Sciences Scholarship Program (UM, PI)
2021 - 2024	'Engineered alveolar organoid models to understand ECM signaling' Pathway to Independence Award (NIH NHLBI R00 HL 151670)
2020 - 2021	'Engineered alveolar organoid models to understand ECM signaling' Pathway to Independence Award (NIH NHLBI K99 HL 151670)
2022 - 2023	'Wireless integration of living systems with microrobotics to guide morphogenesis' (UM START, co-PI)
2017 – 2018	Swiss National Science Foundation Postdoctoral Mobility Fellowship
2016	IBSA Foundation for Scientific Research Fellowship

HONORS AND AWARDS

2025	Macromolecular Rapid Communications Junior Researcher Award, Wiley
2025	Cell and Molecular Bioengineering (CMBE) Rising Star
2024	Cell and Molecular Bioengineering (CMBE) Young Innovator
2023	Edward Mallinckrodt Award, UM Internal Nominee
2021	Searle Scholar, UM Internal Nominee
2020	Penn Health Tech Pilot Award
2018	Gordon Research Seminar: Signal Transduction by Engineered ECMs Podium Presentation Award
2018	ETH Silver Medal (Top 8% of Ph.D. Theses)
2017	Julia Polak European Doctoral Award
2017	Research Award, Swiss Society for Biomaterials and Regenerative Medicine
2015	Racquel Z. LeGeros Award, European Society for Biomaterials
2014	European Orthopaedic Research Society Oral Presentation Award
2014	Swiss Society for Biomaterials and Regenerative Medicine Travel Award
2014	Swiss Society for Biomaterials and Regenerative Medicine Poster Award

PATENTS

Loebel C, Lagisetty K., Decker R. 'Controlling cancer metastases with magnesium alloys' Provisional patent filed through University of Michigan Marshall Gerstein, United States Patent Application No. 63/747,756 filed January 26, 2025.

Patel JM, **Loebel C**, Martin AR, Mauck RL, Burdick JA, 'Systems for targeted tissue biosealing or repair' Provisional patent filed through UPenn Center for Technology Transfer, United States Patent Application No. 17259758 filed November 4, 2021.

PUBLICATIONS

Google Scholar: 2276 total citations, h-index: 22 (as of January 2025), [Loebel lab members](#)

ORIGINAL RESEARCH ARTICLES (*indicates authors contributed equally)

34. Stewart DC, Brisson BK, Dekky B, Berger AC, Yen W, Mauldin EA, **Loebel C**, Gillette D, Assenmacher CA, Quincey C, Stefanovski D, Cristofanilli M, Cukierman E, Burdick JA, Borges VF, Volk SW. et al. (2024). Prognostic and therapeutic implications of tumor-restrictive type III collagen in the breast cancer microenvironment. *npj Breast Cancer* 10, 86. 2024

33. Eiken MK, Levine JE, Lee S, Lukpat S, Plaster EM, Bala V, Spence JR., **Loebel C**. Polymer Design of Microwell Hydrogels Influences Epithelial–Mesenchymal Interactions During Human Bronchosphere Formation. *Adv. NanoBiomed Res.* 2300110, 2024.

32. [Ahmed DW*](#), [Tan MW*](#), [Gabbard J](#), Liu Y, Hu MM, [Stevens M](#), Midekssa FS, Han L, Zemans RL, Baker BM, **Loebel C**. Local photo-crosslinking of native tissue matrix regulates cell function. bioRxiv 2024.08.10.607417

31. [Wei K*](#), [Roy A*](#), [Ejike S](#), [Eiken MK](#), [Plaster EM](#), [Shi A](#), Shtein M, **Loebel C**. Magnetoactive hammocks to probe lung epithelial cell function. *Cell Mol Bioeng Journal*, Volume 17, pages 317–327, 2024.

30. [Eiken MK](#), Childs CJ, Brastrom LK, Frum T, [Plaster EM](#), [Schachaf O](#), [Pfeiffer S](#), [Levine JE](#), Alysandratos K, Kotton DN, Spence JR, **Loebel C**. Nascent matrix deposition supports alveolar organoid formation from aggregates in synthetic hydrogels. *Stem Cell Reports*, Volume 20, Issue 1, 102376, 2024.

29. Duran P, Yang BA, [Plaster EM](#), [Eiken MK](#), **Loebel C**, Aguilar AA. Tracking of Nascent Matrix Deposition during Muscle Stem Cell Activation across Lifespan Using Engineered Hydrogels. *Advanced Biology* 2400091, 2024.

28. Cruz-Acuña R, Kariuki SW, Sugiura K, Karaiskos S, [Plaster EM](#), **Loebel C**, Efe G, Karakasheva TA, Gabre JT, Hu J, Burdick JA, Rustgi AK. Engineered hydrogel reveals contribution of matrix mechanics to esophageal adenocarcinoma and identifies matrix-activated therapeutic targets. *JCI* Oct 3:e168146, 2023.

27. Su EY, Kennedy CS, Vega-Soto EE, Pallas BD, [Lukpat SN](#), Hwang DH, Bosek DW, Forester CE, **Loebel C**, Larkin LM. Repairing Volumetric Muscle Loss with Commercially Available Hydrogels in an Ovine Model. *Tissue Eng Part A* 3, 9-10, 2023,

26. [Plaster ME](#), [Eiken MK](#), **Loebel C**. DMTMM-Mediated Synthesis of Norbornene-Modified Hyaluronic Acid Polymers to Probe Cell-Hydrogel Interactions. *Carbohydr. Polym. Technol. Appl.*, 100360, 2023.

25. Schwab A, Wesdorp MA, Xu J, Abinzano F, **Loebel C**, Falandt M, Levato R, Eglin D, Narcisi R, Stoddart MJ, Malda J, Burdick JA, D'Este M, van Osch GJVM. Modulating design parameters to drive cell invasion into hydrogels for osteochondral tissue formation. *J. Orthop. Transl.* 41 42-53, 2023.

24. Guimaraes PPG, Figueroa-Espada CG, Riley RS, Gong N, Xue L, Sewastianik T, Dennis PS, **Loebel C**, Chung A, Shepherd SJ, Haley RM, Hamilton AG, El-Mayta R, Wang K, Langer R, Anderson DG, Carrasco RD, Mitchell MJ. In vivo bone marrow microenvironment siRNA delivery using lipid-polymer nanoparticles for multiple myeloma therapy. *PNAS* 120 (25) e2215711120, 2023.

23. Goldshmid R, Simaan-Yameen H, Ifergan L, **Loebel C**, Burdick JA, Seliktar D. Modulus-dependent effects on neurogenic, myogenic, and chondrogenic differentiation of human mesenchymal stem cells in three-dimensional hydrogel cultures. *J Biomed Mater Res.* 1- 18, 2023.

22. [Roy A](#), Zhang Z, [Eiken MK](#), [Shi A](#), Pena-Francesch A, **Loebel C**. Programmable Tissue Folding Patterns in Structured Hydrogels, *Advanced Materials* 2300017, 2023.

21. Shiraishi K, Shah PP, Morley MP, **Loebel C**, Santini GT, Katzen J, Basil MC, Lin SM, Planer JD, Cantu ED, Jones DL, Nottingham AN, Li S, Cardenas-Diaz FL, Zhou S, Burdick JA, Jain R, Morrissey EE. Biophysical forces mediated by respiration maintain lung alveolar epithelial cell fate, *Cell* 186 (7), 1478-1492, 2023.
20. Childs CJ, Holloway EM, Sweet CW, Tsai YH, Wu A, Vallie A, Eiken MK, Capeling MM, Zwick RK, Palikuqi B, Trentesaux C, Wu JH, Pellón-Cardenas O, Zhang CJL, Glass I, **Loebel C**, Yu Q, Camp JG, Sexton JZ, Klein OD, Verzi MP, Spence JR. EPIREGULIN creates a developmental niche for spatially organized human intestinal enteroids, *JCI Insight* 8(6), 2023.
19. Heo SJ, Thakur S, Chen X, **Loebel C**, Xia X, McBeath R, Burdick JA, Shenoy VB, Mauck RL, Lakadamyali M. Aberrant chromatin reorganization in cells from diseased fibrous connective tissue in response to altered chemomechanical cues, *Nature Biomedical Engineering* 7(2) 177-191, 2023.
18. **Loebel C**, Weiner AI, Eiken, ML, Katzen JB, Morley MP, Bala V, Cardenas-Diaz FL, Davidson MD, Shiraishi K, Basil MC, Spence JR, Ochs M, Beers MF, Morrissey EE, Vaughan AE, Burdick JA. Microstructured hydrogels to guide self-assembly and function of lung alveolospheres. *Advanced Materials* July; 34;28 (2202992), 2022.
17. **Loebel C**, Saleh AM, Jacobson KR, Daniels R, Mauck RL, Calve S, Burdick JA. Metabolic labeling of secreted matrix to investigate cell–material interactions in tissue engineering and mechanobiology. *Nature Protocols*, March; 17: 618–648, 2022.
16. Yang B, Wei K, **Loebel C**, Zhang K, Feng Q, Li R, Wong DS, Xu X, Lau C, Chen X, Zhao P, Yin Y, Burdick JA, Wang Y, Bian L, Enhanced Mechanosensing of Cells in Synthetic 3D Matrix with Controlled Biophysical Dynamics, *Nature Communications*, 12:3514, 2021.
15. Zepp JA, Morley MP, **Loebel C**, Kremp MM, Chaudhry FN, Basil MC, Leach JP, Liberti DC, Niethamer TK, Ying Y, Jayachandran S, Babu AS, Zhou S, Frank DB, Burdick JA, Morrissey EE, Genomic, Epigenomic, and Biophysical Cues Controlling the Emergence of the Lung Alveolus, *Science*, 371:eabc3172, 2021.
14. Patel JM, **Loebel C**, Saleh KS, Wise BC, Bonnevie ED, Miller LM, Carey JL, Burdick JA, Mauck RL, Stabilization of damaged articular cartilage with hydrogel-mediated reinforcement and sealing, *Advanced Healthcare Materials*, 10:2100315, 2021.
13. Cosgrove BD, **Loebel C**, Driscoll TP, Tsinman TK, Dai EN, Heo SJ, Dymant NA, Burdick JA, Mauck RL, Nuclear Envelope Wrinkling Predicts Mesenchymal Progenitor Cell Mechano-Response in 2D and 3D Microenvironments, *Biomaterials*, 270:120662, 2021.
12. **Loebel C***, Kwon M*, Wang C, Han L, Mauck RL, Burdick JA. Metabolic labeling to probe temporal changes in the pericellular matrix at the cell-hydrogel interface. *Advanced Functional Materials*, 30:1909802, 2020.
11. **Loebel C**, Mauck RL, Burdick JA. Local nascent protein deposition and remodeling guide mesenchymal stromal cell mechanosensing and fate in three-dimensional hydrogels. *Nature Materials*, 18, 883-891, 2019.
10. **Loebel C**, Ayoub A, Galarraga JH, Kossover O, Simaan-Yameen H, Seliktar D, Burdick JA. Tailoring supramolecular guest-host hydrogel viscoelasticity with covalent fibrinogen double networks. *Journal of Materials Chemistry B*, 7, 1753-1760, 2019.
9. **Loebel C***, Rodell CB*, Chen MH, Burdick JA. Shear-thinning and self-healing hydrogels as injectable therapeutics and for 3D-printing. *Nature Protocols*, 12(8), 1521-1541, 2017.
8. **Loebel C**, Szczesny SE, Cosgrove BD, Alini M, Zenobi-Wong M, Mauck RL, Eglin D. Crosslinking Chemistry of Tyramine-Modified Hyaluronan Hydrogels Alters Mesenchymal Stem Cell Early Attachment and Behavior. *Biomacromolecules*, 18(3), 855-864, 2017.

7. **Loebel C**, Stauber T, D'Este M, Alini M, Zenobi-Wong M, Eglin D. Fabrication of cell-compatible hyaluronan hydrogels with a wide range of biophysical properties through high tyramine functionalization. *Journal of Materials Chemistry A*, 5(12), 2355-2363, 2017.
6. Li B, Menzel U, **Loebel C**, Schmal H, Alini M, Stoddart MJ. Monitoring live human mesenchymal stromal cell differentiation and subsequent selection using fluorescent RNA-based probes. *Scientific Reports*, 6, 26014, 2016.
5. **Loebel C***, Broguiere N*, Alini M, Zenobi-Wong M, Eglin D. Microfabrication of Photo-Cross-Linked Hyaluronan Hydrogels by Single- and Two-Photon Tyramine Oxidation. *Biomacromolecules*, 16(9), 2624-30, 2015.
4. Voss JO, **Loebel C**, Bara JJ, Fussinger MA, Duttenhoefer F, Alini M, Stoddart MJ. Effect of Short-Term Stimulation with Interleukin-1beta and Differentiation Medium on Human Mesenchymal Stromal Cell Paracrine Activity in Coculture with Osteoblasts. *BioMed Research International*, 714230, 2015.
3. **Loebel C**, D'Este M, Alini M, Zenobi-Wong M, Eglin D. Precise tailoring of tyramine-based hyaluronan hydrogel properties using DMTMM conjugation. *Carbohydrate Polymers*, 115, 325-33, 2015.
2. **Loebel C**, Czekanska EM, Bruderer M, Salzmann G, Alini M, Stoddart MJ In vitro osteogenic potential of human mesenchymal stem cells is predicted by Runx2/Sox9 ratio. *Tissue Engineering Part A*, 21(1-2), 115-23, 2014.
1. **Loebel C**, Czekanska EM, Staudacher J, Salzmann G, Richards RG, Alini M, Stoddart MJ. The calcification potential of human MSCs can be enhanced by interleukin-1beta in osteogenic medium. *Journal of Tissue Engineering and Regenerative Medicine*, 11(2), 564-571, 2014.

REVIEWS

5. Shi, A, **Loebel C**. An in vitro model for studying crosstalk between muscle cells and neurons. *Device*, Volume 3, Issue 1, 100655
4. Lehmann M, Krishnan R, Sucre J, Kulkarni HS, Pineda RH, Anderson C, Banovich NE, Behrsing HP, Dean CH, Haak A, **Loebel C**, Koengishoff, M et al. (2025). Precision-Cut Lung Slices: Emerging Tools for Preclinical and Translational Lung Research: An Official American Thoracic Society Workshop Report. *American Journal of Respiratory Cell and Molecular Biology* 72, 16-31.
3. Ahmed DW*, Eiken MK*, DePalma SJ, Helms AS, Zemans RL, Spence JR, Baker BM, **Loebel C**. Integrating mechanical cues with engineered platforms to explore cardiopulmonary development and disease. *iScience* 26 (12) 2023.
2. Roy A, **Loebel C**. Magnetic soft robotics to manipulate the extracellular matrix in vitro. *Cell*, 186(23):4992-4993, 2023
1. **Loebel C** and Burdick JA. Engineering Stem and Stromal Cell Therapies for Musculoskeletal Tissue Repair. *Cell Stem Cell*, 22, 325-339, 2018.

ABSTRACT AND CONTRIBUTED PRESENTATIONS

31. Su EY and Kennedy CS, Vega-Soto EE, Pallas BD, Lukpat SN, Hwang DH, Bosek DW, Forester CE, **Loebel C**, Larkin, LM. Repairing Volumetric Muscle Loss with Commercially Available Hydrogels in an Ovine Model. Presented at TERMIS, Seattle, Washington, June 2024, podium.
30. Roy A, Shi A, Abraham A, **Loebel C**. Micromagnetic hydrogels to generate dynamic and reversible tissue folding patterns *in vitro*, American Chemical Society, New Orleans, MI USA, March 2024, podium.

29. Plaster E, Eiken MK, **Loebel C**. Synthesis of norbornene-modified hyaluronic acid hydrogels via water-based DMTMM coupling, National Graduate Research Polymer Conference, Ann Arbor, MI USA, June 2023, podium.
28. Roy A, Zhang Z, Shi A, **Loebel C**. Micromagnetic hydrogels to generate dynamic and reversible tissue folding patterns *in vitro*, National Graduate Research Polymer Conference, Ann Arbor, MI USA, June 2023, podium.
27. Ahmed D, Xia J, Zemans RL, Baker BM, **Loebel C**. Local Matrix Stiffening as an *Ex-Vivo* Model of Early Pulmonary Fibrotic Remodeling, Society for Biomaterials Annual Meeting, San Diego, CA USA, April 2023, podium.
26. Roy A, Zhang Z, Shi A, **Loebel C**. Micromagnetic hydrogels to generate dynamic and reversible tissue folding patterns *in vitro*, Society for Biomaterials Annual Meeting, San Diego, CA USA, April 2023, poster, *2nd place Tissue Engineering SIG poster award.
25. Eiken MK, Spence J, **Loebel C**. Engineered 3D hydrogels to probe mechanisms of matrix stiffness within lung alveolar epithelial organoids, Society for Biomaterials Annual Meeting, San Diego, CA USA, April 2023, *2nd place Ph.D. thesis competition.
24. Eiken MK, Spence J, **Loebel C**. Engineered 3D hydrogels to probe mechanisms of matrix stiffness within lung alveolar epithelial organoids, Society for Biomaterials Annual Meeting, San Diego, CA USA, April 2023, poster, *1st place Dr. Rena Bizios Poster Award.
23. Plaster E, Eiken MK, **Loebel C**. Synthesis of norbornene-modified hyaluronic acid hydrogels via water-based DMTMM coupling, Society for Biomaterials Annual Meeting, San Diego, CA USA, April 2023, poster.
22. Duran P, **Loebel C**, Aguilar C. Impairment in Nascent Matrix Deposition during Aging, TERMIS-AM Annual Conference, April 2023, podium.
21. Su EY, Kennedy CS, Vega-Soto EE, Forester CE, Hwang DH, **Loebel C**, Larkin LM. Repairing Volumetric Muscle Loss with Commercially Available Hydrogels in the Ovine Peroneus Tertius Muscle, Orthopedic Research Society Meeting, Dallas, TX, February 2023, poster.
20. Roy A, Hume E, **Loebel C**. Harnessing Mechanical Instabilities in Hydrogel Bilayers to Recreate Tissue Folding Patterns, Macromolecular Science & Engineering Symposium, October 2022, poster.
19. Ahmed D, Xia J, Zemans RL, Baker BM, **Loebel C**. Precision cut lung slices towards engineering an *ex vivo* model of early pulmonary fibrosis, Macromolecular Science & Engineering Symposium, October 2022, poster.
18. Eiken MK, Spence JR, **Loebel C**. Design of 3D hydrogels towards modeling pulmonary fibrosis in alveolar epithelial organoids, Macromolecular Science & Engineering Symposium, October 2022, podium, *1st place podium presentation award.
17. Eiken MK, Spence JR, **Loebel C**. Design of 3D hydrogels towards modeling pulmonary fibrosis in alveolar epithelial organoids, Biomedical Engineering Society Annual Meeting, San Antonio, TX USA, October 2022, poster.
16. Ahmed D, Xia J, Zemans RL, Baker BM, **Loebel C**. Precision cut lung slices towards engineering an *ex vivo* model of early pulmonary fibrosis, Biomedical Engineering Society Annual Meeting, San Antonio, TX USA, October 2022, podium.
15. Roy A, Hume E, **Loebel C**. Harnessing Mechanical Instabilities in Hydrogel Bilayers to Recreate Tissue Folding Patterns, Biomedical Engineering Society Annual Meeting, San Antonio, TX USA, October 2022, podium.
14. Roy A, **Loebel C**. Tough Hydrogels to recreate tissue folding, Macromolecular Science & Engineering Symposium, virtual meeting, October 2021, poster.

13. **Loebel C**, Cardenas L, Weinert AI, Vaughan AE, Morrissey EE, Burdick JA. Microstructured hydrogels to guide self-assembly and scalable growth of lung alveolar epithelial organoids, Society for Biomaterials Annual Meeting, virtual meeting, April 2021, pre-recorded presentation.
12. **Loebel C**, Zepp JA, Morrissey EE, Burdick JA. Microstructured Hydrogels for Scalable and Purified Production of Bronchial Organoids, Biomedical Engineering Society Annual Meeting, Philadelphia, PA USA, October 2019, podium.
11. **Loebel C**, Kwon M, Duan T, Mauck RL, Burdick JA. Metabolic Labeling to Probe Temporal Changes in the Pericellular Matrix at the Cell-Hydrogel Interface, Biomedical Engineering Society Annual Meeting, Philadelphia, PA USA, October 2019, podium.
10. **Loebel C**, Mauck RL, Burdick JA. Nascent protein secretion directs cell mechanosensing and function in three-dimensional hydrogels, Society for Biomaterials Annual Meeting, Seattle, WA USA, April 2019, podium.
9. **Loebel C**, Mauck RL, Burdick JA. Nascent protein secretion and remodeling guide mesenchymal stromal cell behavior and fate in three-dimensional hydrogels, Gordon Research Conference (Signal Transduction by Engineered Extracellular Matrices), Andover, NH USA, July 2018, podium.
8. **Loebel C**, Mauck RL, Burdick JA. Nascent protein secretion and remodeling guide mesenchymal stromal cell behavior and fate in three-dimensional hydrogels, Gordon Research Seminar (Signal Transduction by Engineered Extracellular Matrices), Andover, NH USA, July 2018, podium.
7. **Loebel C**, Ayoub A, Galarraga JH, Kossover O, Simaan-Yameen H, Seliktar D, Burdick JA, Tailoring supramolecular guest-host hydrogel viscoelasticity with covalent double networks, Society for Biomaterials Annual Meeting, Atlanta, GA USA, April 2018, podium.
6. **Loebel C**, Ayoub A, Galarraga JH, Kossover O, Simaan-Yameen H, Seliktar D, Burdick JA. Tailoring supramolecular guest-host hydrogel viscoelasticity with covalent double networks, Northeast Bioengineering Conference, Philadelphia, PA USA, March 2018, podium.
5. **Loebel C**, Rodell CB, Burdick JA. Injectable supramolecular double-network hyaluronic acid hydrogel towards stem cell chondrogenesis, Tissue Engineering and Regenerative Medicine Annual Meeting, Davos, Switzerland, June 2017, podium.
4. **Loebel C**, Cosgrove BD, Alini M, Zenobi-Wong M, Mauck RL, Eglin E., Crosslinking Chemistry of Tyramine-Modified Hyaluronan Hydrogels Alters Mesenchymal Stem Cell Attachment and Behavior, World Biomaterial Conference, Montreal, Canada, May 2016, podium.
3. **Loebel C**, Stauber T, D'Este M, Alini M, Zenobi-Wong M, Eglin D. Tailoring of DMTMM conjugated HA-Tyr allows precise control of cellular environment, European Society for Biomaterials, Kraków, Poland, September 2015, podium.
2. **Loebel C**, D'Este M, Alini M, Zenobi-Wong M, Eglin D. Precise tailoring of tyramine based hyaluronan hydrogels using DMTMM conjugation, European Orthopaedic Research Society Annual Meeting, Nantès, France, July 2014, podium.
1. **Loebel C**, Czekanska EM, Alini M, Stoddart MJ, Early prediction of osteogenic potential of human MSCs by Runx2/Sox9 ratio, European Orthopaedic Research Society Annual Meeting, Nantès, France, July 2014, podium.

PROFESSIONAL ACTIVITIES AND SERVICE

Ad Hoc Journal Reviewer: *Acta Biomaterialia, Carbohydrate Polymers, ACS Biomaterials Science & Engineering, Stem Cells, Nature Materials, Nature Communications, Scientific Reports, Soft Matter, Tissue Engineering, European Cells and Materials, iScience, Advanced Materials, Advanced Healthcare Materials, Science Advances, Journal of Biomedical Materials Research Part A, Bioactive Materials, Biomaterials, Bioengineering & Translational Medicine, Matter, Materials Today Bio, American Journal of Respiratory Cell and Molecular Biology*

2024 - Associate Editor, Journal of Biomedical Materials Research, Wiley
2023 Study Section, Canadian Foundation for Innovation
2023 Ad hoc reviewer, NIH Special Emphasis Panel
2023 Reviewer, UM Falk Catalyst Award
2022 - 2025 Reviewer, National Science Foundation
2022 Chair, Macromolecular Science & Engineering Annual Symposium
2022 Co-Chair, Macromolecular Science & Engineering Mental Health and DEI Symposium
2022 - 2023 Associate Editor, Nanoselect, Wiley
2022 Study Section, Canadian Foundation for Innovation
2019 – 2022 Chair, Society for Biomaterials, Young Scientist Group (Vice Chair 2020/2021)
2022 Co-Chair, Gordon Research Seminar Signal Transduction and Engineered ECMs
2020 – 2022 Reviewer, ADMIRE Fellowship Programme, Science Foundation Ireland
2017 Chair Student Activities, Tissue Engineering and Regenerative Medicine Annual Meeting, Davos, Switzerland
2016 – 2017 Secretary, Young Scientists Tissue Engineering and Regenerative Medicine Council
2016 – 2017 Representative Young Scientists, European Society for Biomaterials
2014 – 2016 Secretary, Young Scientists, Swiss Society for Biomaterials and Regenerative Medicine
2014 – 2015 Representative Young Scientists, Task Force Regenerative Medicine Swiss Society for Biomaterials and Regenerative Medicine

DEPARTMENTAL SERVICE

2025 - Graduate Admission Committee, Bioengineering, University of Pennsylvania
2023 - 2024 Graduate Student Association Outreach Faculty Advisor, Materials Science & Engineering, University of Michigan
2023 Faculty Search Committee Bioscience Initiative, Dental School, University of Michigan
2023 National Graduate Research Polymer Conference (panelist)
2023 - 2024 Bioscience Initiative Biomaterials in Regenerative Medicine Seminars (chair)
2022 - 2024 Undergraduate Committee, Materials Science & Engineering, University of Michigan (committee member)
2021 Graduate School Admission Committee, Materials Science & Engineering, University of Michigan (committee member)
2021 College of Engineering Symposium, University of Michigan (reviewer, judge)

INVITED TALKS

25. Australasian Wound and Tissue Repair Society (AWTRS) and the Matrix Biology Society for Australia and New Zealand (MBSANZ), plenary speaker, Perth, Australia, October 2024
24. NIH /NIA workshop (3-D *in vitro* tissue systems for research on aging): 'Engineered cellular systems', invited speaker, July 2024
23. International Society for Stem Cell Research, invited talk, Hamburg, Germany, July 2024
22. Gordon Research Conference: Signal Transduction and Engineered ECMs, invited talk, New Hampshire, US, July 2024
21. World Biomaterials Conference, Keynote, Daegu, South Korea, May 2024
20. Tissue Talks: 'Engineering the cell-matrix interface', virtual, September 2023
19. European Society for Biomaterials Annual Meeting: 'Engineering the cell-matrix interface', Keynote, Davos, Switzerland, September 2023
18. Stem Cells, Cell Therapies, and Bioengineering in Lung Biology and Diseases Conference: 'Microstructured Hydrogels to guide lung progenitor cell self-organization and function' Burlington, Vermont, July 2023
17. NIH /NIDDK workshop (Unraveling the secrets of the (renal) interstitium): 'Metabolic labeling of the Extracellular Matrix, virtual presentation, March 2023
16. Fusion Conference on Growth Factors in Regeneration and Regenerative Medicine Conference: 'Engineered matrices to guide alveolar organoid self-assembly and function', Cancun Mexico, February 2023
15. University of Michigan Cellular Plasticity and Organ Design (CPOD) International Symposium: 'Microstructured hydrogels to guide self-assembly and function of lung alveolospheres, Ann Arbor, MI, November 2022
14. University of Michigan Pulmonary Research Conference: 'Engineered hydrogels to guide progenitor cell self-organization and function', Ann Arbor, MI, April 2022
13. University of Michigan Orthopaedic Research Laboratory Seminar: 'Engineering approaches to understand and modulate the cell-matrix interface, Ann Arbor, MI, March 2022
12. University of Michigan Bioscience Initiative Programmable Biomaterials - Grand Challenges workshop: 'Identifying local signatures in engineered matrices', Virtual, January 2022
11. Gordon Research Conference Lung Development, Injury and Repair: 'Microstructured hydrogels to guide self-assembly and function of lung alveolospheres', New Hampshire, November 2021
10. University College London: 'Engineering approaches to understand and modulate the cell matrix interface', virtual presentation, November 2021
9. Matrix Seminar Series, Lund University: 'Engineered hydrogels to guide progenitor cell self-organization and function', virtual presentation, November 2021
8. TERMIS World Congress: 'Engineering the cell-matrix interface - understanding and guiding cell function' Symposium keynote, virtual presentation, 2021
7. Oral Health Sciences Seminar Series, University of Michigan: 'Engineering the cell-material interface to understand and guide cell function', virtual presentation, June 2021

6. Center for Cell Plasticity and Organ Design Seminars, University of Michigan: 'Engineering the cell-matrix interface - understanding and guiding cell function', virtual presentation, February 2021
5. Virtual Seminars in Biomedical Science: 'Metabolic labeling in 3D cell-hydrogel studies', June 2020
4. Bioengineering Seminar Series, Temple University: 'Engineering the cell-material interface to direct cell behavior and fate' Philadelphia, PA, February 2019
3. Martin-Luther University Halle-Wittenberg: 'Engineering hyaluronan hydrogels to modulate cell behavior' Halle-Saale, Germany, June 2018
2. American Chemical Society Mid-Atlantic Student Chapter Seminar Series, Drexel University: 'Engineered hydrogels for musculoskeletal tissue repair' Philadelphia, PA, October 2017
1. University Hospital Regensburg: 'Engineering hyaluronan hydrogels to modulate stem cell behavior' Regensburg, Germany, June 2017

TEACHING AND MENTORING EXPERIENCE

Advising and mentoring

2025 - **Loebel Lab, Department of Bioengineering University of Pennsylvania,**

Postdoctoral Fellows:

Heather Giza, Ph.D. (University of Pennsylvania, 2025 – present)

Jua Kim, Ph.D. (University of Pennsylvania, 2025 – present)

Matthew Tan, Ph.D. (University of Michigan PCCM T32 fellow, 2023 – present)

Ph.D. Students:

Yu-Chung Liu (Biomedical Engineering Ph.D. advisor, 2023 – present)

Donia Ahmed (Biomedical Engineering Ph.D. advisor, 2021 – present, Rackham Merit Fellow, CBTP T32 fellow)

Avinava Roy (Materials Science & Engineering Ph.D. advisor, 2021 – present, Regenerative Medicine Fellow, American Heart Association Pre-doctoral Fellow, University of Michigan)

2021 – 2025 **Loebel Lab, Department of Materials Science & Engineering, University of Michigan, Ann Arbor, MI**

Ph.D. Students:

Heather Giza (Cancer Biology Ph.D. co-advisor, 2023 – 2024)

Eleanor Plaster (Biomedical Engineering Ph.D. advisor, 2024 – TEAM T32 fellow, NSF GRFP Honorable Mention)

Madeline Eiken (Biomedical Engineering Ph.D. co-advisor, 2021 – 2024, NSF GRFP Fellow, NHLBI F31 not accepted)

Master Students:

Sonia Ejike (Dental school OHS-MS Program advisor, 2023 – 2024)

Undergraduate Students:

Esther Gao (BME490 advisor, 2023 - present)

Justine Levine (SURE advisor, 2023 - 2024)

Jackson Gabbard (SURE advisor, 2023 – 2024)

Shinyeong Lee (BME490 advisor, 2023 - 2024)

Miriam Stevens (BME490 advisor, 2022 – 2024)

Alan Shi (MATSCIE490 advisor, 2021 – 2024)

Orren Shachaf (SROP advisor, summer 2022)
Vikram Bala (BME490 advisor, 2021 – 2022)
Samantha Lukpat (BME490 advisor, 2021 – 2022)
Suzanne Pfeifer (BME490 advisor, 2021 – 2022)
Everett Hume (BME490 advisor, 2021 – 2022)

2021 - **Department of Materials Science & Engineering, University of Michigan, Ann Arbor, MI**

Samantha Schwartz (Ph.D. Qualifying Exam Member, 202)
Michael Hu (Ph.D. Qualifying Exam Member, 2023)
Stephanie Steltzer (Ph.D. Thesis Committee Member, 2023 – present)
Emily Thomas (Ph.D. Qualifying Exam Cognate, 2023)
Atticus McCoy (Ph.D. Qualifying Exam Cognate, 2023)
Ben Sexton (Ph.D. Qualifying Exam Committee Member, 2023)
Anna Argento (Ph.D. Qualifying Exam Cognate, 2022)
Jingyi Xia (Ph.D. Qualifying Exam Cognate, 2022)
Cecilia Kinane (Ph.D. Prelim Exam Committee Member, 2022)
Zenghao Zhang (Ph.D. Prelim Exam Committee Member, 2022)

2016 – 2021 **Burdick Lab, University of Pennsylvania, Philadelphia, PA**

Mentor to undergraduate research assistants (Bruce Enzmann, Christina Hummel, Nikolas DiCaprio, Ryan Daniels)

Mentor to Master students (Karyll Davis, Tianbi Duan)

2013 – 2016 **AO Research Institute, Davos, Switzerland**

Mentor to undergraduate research assistants (Aleksandra Sadowska, Tino Stauber)
Mentor to medical fellow (Jan Voss)

Teaching

Fall 2024 MATSCIE 250 Principles of Engineering Materials (92 students)
Winter 2024 MATSCIE 493-076 Materials for Health and Biotechnology (34 students)
Winter 2024 BIOMEDE 419 Quantitative Physiology (Lecture, 65 students)
Fall 2023 MATSCIE 250 Principles of Engineering Materials (95 students)
Winter 2023 MATSCIE 593-073 Advanced Biomaterials (12 students)
Winter 2023 MATSCIE 890 Colloquium in Materials Science (56 students)
Winter 2023 BIOMEDE 419 Quantitative Physiology (Lecture, 95 students)
Fall 2022 MATSCIE 890 Colloquium in Materials Science (54 students)
Fall 2022 MATSCIE 250 Principles of Engineering Materials (65 students)
Fall 2022 BIOMEDE 419 Quantitative Physiology (Lecture, 90 students)
Winter 2022 MATSCIE 593-073 Advanced Biomaterials (34 students)
Winter 2022 MATSCIE 890 Colloquium in Materials Science (51 students)
Fall 2021 BIOMEDE 419 Quantitative Physiology (Lecture, 150 students)
Fall 2021 MATSCIE 250-103 Principles of Engineering Materials Discussion (28 students)
Summer 2020 CEMB Boot Camp (ImageJ workshop)
Spring 2020 CAMB703/BE640 The ECM, Adhesion Receptor Signaling, and Translational Biomechanics (Lecture)
Spring 2020 BE 553 Principles, Methods, and Applications of Tissue Engineering (Lecture)

Spring 2019 BE 553 Principles, Methods, and Applications of Tissue Engineering (Lecture)